UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/526,221	11/15/2005	Paulo Cavalcanti Gomes Ferreira	265833US0X PCT	8194

22850 7590 04/02/2009

OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, P.C.
1940 DUKE STREET
ALEXANDRIA, VA 22314

EXAMINER	
COLLINS, CYNTHIA E	

ART UNIT	PAPER NUMBER
1638	

NOTIFICATION DATE	DELIVERY MODE
04/02/2009	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patentdocket@oblon.com
oblonpat@oblon.com
jgardner@oblon.com

Office Action Summary	Application No.	Applicant(s)	
	10/526,221	FERREIRA ET AL.	
	Examiner	Art Unit	
	Cynthia Collins	1638	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *September 2, 2008, January 9, 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-24 and 30-40* is/are pending in the application.

4a) Of the above claim(s) *15,30-33,36 and 37* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-14,16-24,34,35 and 38-40* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

The Amendment filed January 9, 2009 has been entered.

Claims 25-29 are cancelled.

Claims 1-14, 16-24 and 34-35 are currently amended.

Claim 15 is withdrawn, currently amended.

Claims 30-33 and 36-37 are withdrawn.

Claims 38-40 are new.

Claims 1-24 and 30-40 are pending.

Claims 1-14, 16-24, 34-35 and 38-40 are examined.

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

All previous objections and rejections not set forth below have been withdrawn.

Election/Restrictions

Applicants' request that the claims of any nonelected group which depend from or otherwise include all the limitations of an allowed elected claim, be rejoined upon an indication of allowability for the elected claim, is acknowledged (replies page 11).

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-2, 4-14, 16-24 and 34-35 remain rejected, and claims 38-40 are rejected, under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention, for the reasons of record set forth in the office action mailed April 2, 2008.

Applicants' arguments filed September 2, 2008 and January 9, 2009 have been fully considered but they are not persuasive.

Applicants maintain that the rejection no longer applies because the present claims employ both structural and functional limitations to describe the claimed products (replies page 12).

The rejection is maintained with respect to claims 1-2, 4-14, 16-24 and 34-35, and applied to new claims 38-40, because Applicant has not described a representative number of species falling within the scope of the claimed genus which encompasses numerous undisclosed and/or uncharacterized nucleic acid sequences that are capable of increasing expression of a cdc27a gene, nor the structural features unique to the genus that are correlated with the required function (claims 14, 21 and 23-24). Applicant also has not described a representative number of species falling within the scope of the claimed genus which encompasses numerous undisclosed and/or uncharacterized cdc27a nucleic acid sequences that are useful for specifically modifying a plant's phenotype when their expression is increased in a plant or plant part, nor the structural features unique to the genus that are correlated with the required function (claim 22). Applicant additionally has not described a representative number of species falling within the scope of the

claimed genus which encompasses cdc27a nucleic acid sequences that encode CDC27A proteins that are at least 95% or 99% homologous to SEQ ID NO:2 and that are useful for specifically modifying a plant's phenotype when their expression is increased in a plant or plant part, nor the structural features unique to the genus that are correlated with the required function (Claims 1-2, 4-13, 16-20, 34-35 and 38-40).

Claims 1-2, 4-14, 16-24 and 34-35 remain rejected, and claims 38-40 are rejected, under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for a method comprising introducing into a plant in a sense direction a cdc27 nucleic acid sequence having a sequence of SEQ ID NO:1 or encoding SEQ ID NO:2, does not reasonably provide enablement for methods comprising introducing into a plant other nucleic acid sequences. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention commensurate in scope with these claims, for the reasons of record set forth in the office action mailed April 2, 2008.

Applicants' arguments filed September 2, 2008 and January 9, 2009 have been fully considered but they are not persuasive.

Applicants maintain that the rejection no longer applies because no undue experimentation would be required to make and use the claimed products which are described by structural and functional limitations (replies page 12).

The rejection is maintained with respect to claims 1-2, 4-14, 16-24 and 34-35, and applied to new claims 38-40, because the specification does not provide sufficient guidance with respect to which nucleic acids other than a cdc27nucleic acid sequence having a sequence of

SEQ ID NO:1 or encoding SEQ ID NO:2 will increase the expression of a cdc27a nucleic acid in a plant cell and produce a predictable result. Such guidance is necessary because the effect of expressing in a plant a nucleic acid encoding CDC27 homologue is unpredictable. Absent such guidance one skilled in the art would have to screen a variety of different types of nucleic acids for their ability to increase the expression of a cdc27a nucleic acid in a plant cell, and then further determine their effect when expressed in a plant transformed therewith in order to identity other nucleic acids that will increase the expression of a cdc27a nucleic acid in a plant cell and produce a predictable result. Such a trial and error approach to practicing the claimed invention would constitute undue experimentation.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 21 remains rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention, for the reasons of record set forth in the office action mailed April 2, 2008.

Applicants' arguments filed September 2, 2008 and January 9, 2009 have been fully considered but they are not persuasive.

Applicants maintain that the rejection is rendered moot in view of the claim amendments (replies page 12).

The rejection is maintained because the claim amendments do not provide antecedent basis for "the nucleic acid sequence of (i)" recited in line 6.

Claim 10, and claims 11-13 dependent thereon, are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 10, and claims 11-13 dependent thereon, are indefinite because there is insufficient antecedent basis for "said changed development" recited in line 2 of claim 10.

Claim 20 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 20 is indefinite because there is insufficient antecedent basis for "The plant part" recited in line 1.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 14, 21, 22 ,23 and 24 remain rejected, and claim 38 is rejected, under 35 U.S.C. 102(b) as being anticipated by Hemerly A. et al. (WO 01/02430, published 11 January 2001), for the reasons of record set forth in the office action mailed April 2, 2008.

Applicants' arguments filed September 2, 2008 and January 9, 2009 have been fully considered but they are not persuasive.

Applicants maintain that because Hemerly does not disclose the step of selecting a plant having at least one modified phenotype selected from the group consisting of increased

plant organ size, increased numbers of a plant organ, earlier flowering, or accelerated development compared to a plant obtained from the corresponding untransformed plant cell, Hemerly does not anticipate the rejected claims (replies pages 12-13).

Applicants arguments are unpersuasive with respect to claims 14, 21, 22 ,23, 24 and 38, because these claims do not require selection for at least one modified phenotype selected from the group consisting of increased plant organ size, increased numbers of a plant organ, earlier flowering, or accelerated development.

With respect to new claim 38, the cdc27a nucleic acid taught by Hemerly encodes an amino acid sequence having at least 95% sequence identity with SEQ ID NO:2.

```
RESULT 1
AAB68952
ID   AAB68952 standard; peptide; 728 AA.
XX
AC   AAB68952;
XX
DT   24-JUL-2008  (revised)
DT   15-JUN-2007  (revised)
DT   18-APR-2001  (first entry)
XX
DE   Arabidopsis thaliana CDC27A1 protein.
XX
KW   Cell cycle regulation; DNA replication; CDC7; CDC27A1; CDC27A2; CDC27B;
KW   nematode resistance; endoreduplication; sterility; polyploidy.
XX
OS   Arabidopsis thaliana.
XX
PN   WO200102430-A2.
XX
PD   11-JAN-2001.
XX
PF   05-JUL-2000; 2000WO-EP006401.
XX
PR   05-JUL-1999;   99EP-00202214.
XX
PA   (CROP-) CROPDESIGN NV.
PA   (UYRI-) UNIV RIO DE JANEIRO.
XX
PI   Hemerly AS,  Ferreira PCG,  Rombauts S;
XX
DR   WPI; 2001-123101/13.
XX
PT   Partially purified plant CDC27 or CDC7 protein homolog, useful for
PT   modulating DNA replication and for producing transgenic plants.
XX
PS   Claim 3; Page 72-74; 86pp; English.
XX
CC   The present invention provides the protein and coding sequences of
CC   several Arabidopsis thaliana proteins which are involved in DNA
CC   replication and the regulation of the cell cycle. These include CDC7,
CC   CDC27A1, CDC27A2 and CDC27B. They are useful in the production of
CC   transgenic and mutant plants, as the mutations in the gene cause proteins
CC   to confer nematode resistance, sterility and polyploidy on plants and
CC   also lead to endoreduplication
CC
CC   Revised record issued on 24-JUL-2008 : Enhanced with precomputed
CC   information from BOND.
XX
SQ   Sequence 728 AA;
```

```
  Query Match             100.0%;  Score 3793;  DB 4;  Length 728;
  Best Local Similarity   100.0%;  Pred. No. 0;
  Matches  728;  Conservative    0;  Mismatches    0;  Indels    0;  Gaps    0;

Qy          1 MMENLLANCVQKNLNHFMFTNAIFLCELLAQFPSEVNLQLLARCYLSNSQAYSAYYLIK 60
              |||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db          1 MMENLLANCVQKNLNHFMFTNAIFLCELLAQFPSEVNLQLLARCYLSNSQAYSAYYLIK 60

Qy         61 GSKTPQSKYLFAFSCFKLDLLGHAEAALLPCEDYAEEVPGGAAGHYLLGLLTYRFSGRKNC 120
              |||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db         61 GSKTPQSKYLFAFSCFKLDLLGHAEAALLPCEDYAEEVPGGAAGHYLLGLLTYRFSGRKNC 120

Qy        121 SIQQFRMALSFDPLCWEAYGELCSLGAAEEASTVFGNVASQRLQKTCVEQAISFSEGATI 180
              |||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        121 SIQQFRMALSFDPLCWEAYGELCSLGAAEEASTVFGNVASQRLQKTCVEQAISFSEGATI 180

Qy        181 DQITSDKALKDTGLSQTEHIPGNQQDLKIMQQPGDIPPNTDRQLSTNGWDLNTPSPVL 240
              |||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        181 DQITSDKALKDTGLSQTEHIPGNQQDLKIMQQPGDIPPNTDRQLSTNGWDLNTPSPVL 240

Qy        241 LQVMDALPPLLLKNMRAPAVEGSLMSVHGVRVRRANFFSEELSAEAQRESGRRRSARIAA 300
              |||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        241 LQVMDALPPLLLKNMRAPAVEGSLMSVHGVRVRRANFFSEELSAEAQRESGRRRSARIAA 300

Qy        301 RKKNPMSQSFGKDSHWLHLSPSESNYAPSLSSMIGKCRIQSSKEVIPDTVTLNDPATTSG 360
              |||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        301 RKKNPMSQSFGKDSHWLHLSPSESNYAPSLSSMIGKCRIQSSKEVIPDTVTLNDPATTSG 360

Qy        361 QSVSDIGSSVDDEKGNPSESSPDRFSLISGISEVSLLKILGDGHRHILMMYKCQEALLA 420
              |||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        361 QSVSDIGSSVDDEKGNPSESSPDRFSLISGISEVSLLKILGDGHRHILMMYKCQEALLA 420

Qy        421 YQKLSQKQYNTHWVLMQVGKAYFELQDYFNADSSFTLAHQKYFYALEGMDTYSTVLYHLK 480
              |||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        421 YQKLSQKQYNTHWVLMQVGKAYFELQDYFNADSSFTLAHQKYFYALEGMDTYSTVLYHLK 480

Qy        481 EEMRLGYLAQELISVDRLSPESWCAVGNCYSLRKDHDTALKMFQRAIQLNERFTYAHTLC 540
              |||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        481 EEMRLGYLAQELISVDRLSPESWCAVGNCYSLRKDHDTALKMFQRAIQLNERFTYAHTLC 540

Qy        541 GHEFALEEFEDAERCYRKALGIDTRUYNAWYGLGMTYLRQEKFEFAQHQFQLALQINPR 600
              |||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        541 GHEFALEEFEDAERCYRKALGIDTRHYNAWYGLGMTYLRQEKFEFAQHQFQLALQINPR 600

Qy        601 SSVIMCYYGIALHESKRNDEALMMMEKAVLTDAKNPLPKYYKAHILTSLGDYHKAQKVLE 660
              |||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        601 SSVIMCYYGIALHESKRNDEALMMMEKAVLTDAKNPLPKYYKAHILTSLGDYHKAQKVLE 660

Qy        661 ELKECAPQHSSVHASLGKIYNQLKQYDKAVLHFGIALDLSPSPSDAVKIKAYMERLILPD 720
              |||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        661 ELKSCAPQSSVHASLGKIYNQLKQYDKAVLHFGIALDLSPSPSDAVKIKAYMERLILPD 720

Qy        721 ELVTEENL 728
              ||||||||
Db        721 ELVTEENL 728
```

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-13, 16-21, 34-35 and 39-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hemerly A. et al. (WO 01/02430, published 11 January 2001) in view of John (U.S. Patent No. 5,750,862, issued May 12, 1998).

The claims are drawn to methods of making plants transformed with a nucleic acid encoding a CDC27A protein that is at least 95% homologous to SEQ ID NO:2, and selecting transformed plants that have a modified phenotype including increased organ size.

The teachings of Hemerly A. et al. are set forth above and in the prior office action.

Hemerly A. et al. do not teach selecting transformed plants that have a modified phenotype including increased organ size and accelerated development.

John teaches methods for controlling plant cell growth comprising modulating the level and/or catalytic activity of a cell cycle control protein in said plant for a time and under conditions sufficient to modify or control cell division, including transformation methods (abstract; column 2 lines 54-64) . John also teaches that his methods can be employed to stimulate cell division, for example in plant organs to increase their final size (paragraph spanning columns 4-5). John additionally teaches that his methods can be also employed to stimulate, for example. canopy growth, and root and shoot growth (column 4 lines 6-48).

Given the teachings of Hemerly A. et al. that DNA replication and mitosis are altered in their cells of plants transformed with a nucleic acid encoding a CDC27A protein that is at least 95% homologous to SEQ ID NO:2, and given the teachings of John that stimulating cell division (mitosis) in plant can stimulate the growth of plants and plant parts, it would have been *prima facie* obvious to one skilled in the art at the time the invention was made to select plants transformed according to the method of Hemerly A. et al. for a modified phenotype associated

with improved growth, such as increased organ size or accelerated development. One skilled in the art would have been motivated to do so in order to develop plants having improved phenotypic characteristics. One skilled in the art would have had a reasonable expectation of success given the state of the art of plant transformation at the time of filing, and given the teachings of both Hemerly A. et al. and John with respect to cell division (mitosis). Accordingly, one skilled in the art would have been motivated to generate the claimed invention with a reasonable expectation of success. Thus, the claimed invention would have been *prima facie* obvious as a whole to one of ordinary skill in the art at the time the invention was made.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Remarks

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cynthia Collins whose telephone number is (571) 272-0794. The examiner can normally be reached on Monday-Friday 8:45 AM -5:15 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Anne Marie Grunberg can be reached on (571) 272-0975. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Cynthia Collins/
Primary Examiner, Art Unit 1638

CC